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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/607,044	06/27/2003	Ku-Hyun Park	053785-5126	6405

9629 7590 03/23/2005

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EXAMINER	
CALEY, MICHAEL H	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 03/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/607,044	PARK ET AL.	
	Examiner	Art Unit	
	Michael H. Caley	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 December 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 June 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, 5, 11, 12, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura (U.S. Patent No. 6,137,554 "Nakamura '554") in view of Nakamura (U.S. Patent No. 5,774,197 "Nakamura '197").

Regarding claims 1 and 11, Nakamura '554 discloses an optically compensated birefringence mode liquid crystal display device having:

first and second substrates (Figure 5 elements 3 and 6) facing and spaced apart from each other;

a liquid crystal material layer (Figure 5 element 10) between the first and second substrates, the liquid crystal material layer having a splay state when a voltage is not applied and having a bend state when a transition voltage is applied (Column 7 lines 16-20);

a first compensation film (Figure 5 element 20a) on an outer surface of the first substrate;

a first polarizing plate (Figure 5 element 2a) on the first compensation film;

a second compensation film (Figure 5 element 20b) on an outer surface of the second substrate;

a second polarizing plate (Figure 5 element 2b) on the second compensation film;

Nakamura '554 fails to disclose the retardation within the proposed ranges in the splay state, the bend state, and the black state. Nakamura '554 discloses the retardation, R1, of the OCB type liquid crystal layer without a voltage applied (splay state) as from 0.8-2.0 (Column 3 lines 40-43). At R1= 0.9 for λ=0.61 um (red), (R1/λ) = 1.475. Nakamura '197 teaches retardation values within the proposed ranges for each of the states for an analogous type of optically compensated bend mode display for both of the bend states. Nakamura '197 teaches a retardation value R2/λ of 0.55 at a minimum applied cell voltage (e.g. 2V, Column 3 lines 14-30 and Column 4 lines 5-7) for maximum transmittance, or the bend white state (Table I embodiment 6, red). Nakamura '197 further teaches a difference in R/λ as 0.4 between the white and black states (Column 3 lines 25-30; Table 3, embodiment 6 red). Accordingly, Nakamura '197 teaches a retardation value R3/λ as 1.0.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed the OCB display device disclosed by Nakamura '554 as proposed, according to the teachings of Nakamura '197. Nakamura '197 teaches improved display characteristics over a range of viewing angles when the relationship R(V)/λ $\leq$0.85 is maintained abstract. By applying the relationship to Nakamura '554, one of ordinary skill would have arrived at retardation values for each of the states within the proposed ranges as shown above. Nakamura '197 teaches the same relationships between applied voltage and retardation (Figures

4 and 5) as relied upon by applicant to arrive at optimal retardation values for the proposed wavelength ranges. Nakamura '197 offers additional variables, such as cell gap width and desired transmittance by which one of ordinary skill would arrive at the proposed values according to a results effective variable optimization (Columns 7 and 8, Tables 1, 2, and 3).

Regarding claims 2 and 12, Nakamura '554 discloses

a first orientation film between the first substrate and the liquid crystal material layer (Figure 7 element B1); and

a second orientation film between the second substrate and the liquid crystal material (Figure 7 element B2),

wherein the first orientation film has the same alignment direction as the second orientation film (Figure 7).

Regarding claims 5 and 15, Nakamura '554 discloses the refractive index anisotropy as within the range of 1.2 to 1.3 (Column 6 lines 10-12).

Claims 3 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura '554 in view of Nakamura '197 and in further view of Hattori et al. (U.S. Patent No. 6,597,424 "Hattori").

Nakamura '554 as modified by Nakamura '197 discloses all of the proposed limitations except for the ratio of the bend elastic modulus over the dielectric constant anisotropy as between 0.85 and 1.5. Hattori, however teaches a ratio for a optically compensated bend mode

display in the bend state as having a ratio of 1.2 within the proposed range (Column 49 lines 18-21).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed the liquid crystal layer having the proposed bend elastic modulus and dielectric constant anisotropy ratio. Hattori teaches conventional values for such parameters of the liquid crystal cell. One would have been motivated to use such parameters for constructing the liquid crystal cell to benefit from the expected results of such characteristics such as fast response time and a wide viewing angle as taught by Hattori (Column 3 lines 2-9).

Claims 4 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura '554 in view of Nakamura '197 and in further view of Noguchi et al. (U.S. Patent No. 5,736,066 "Noguchi").

Nakamura '554 as modified by Nakamura '197 fails to disclose the phase transition temperature as proposed. Noguchi, however, teaches a phase transition temperature within the proposed range (Column 15 lines 40-54).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed the liquid crystal layer having the proposed phase transistion temperature. Noguchi teaches conventional values for such parameters of the liquid crystal cell. One would have been motivated to use such parameters for constructing the liquid crystal cell to benefit from the expected results of such characteristics such as reduced viewing angle dependence on retardation of the liquid crystal layer as taught by Noguchi (Column 3 lines 49-64).

Claims 6-10 and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura '554 in view of Nakamura '197 in further view of Hashimoto (U.S. Patent No. 6,657,690).

Regarding claims 6 and 16, Nakamura '554 as modified by Nakamura '197 fails to disclose each of the compensation film as including a discotic film on the surface of the substrate and a biaxial film on the surface of the discotic film. Hashimoto, however, teaches such an arrangement of compensation films as advantageous in an OCB mode display (Figure 1A elements 1A-4A and 1B-4B; Column 3 lines 15-31).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the first and second compensation films as proposed, each having a discotic film layer and a biaxial film layer. Hashimoto teaches such a structure of compensation films as beneficial to more uniformly compensate a liquid crystal cell across a range of viewing angles without causing light leakage around the frame portions (Column 2 lines 40-64).

Regarding claims 7 and 17, Nakamura '554 as modified by Nakamura '197 fails to disclose the proposed refractive index anisotropy value for the first and second discotic films. Nakamura '554, however, teaches such a value for the liquid crystal cell (Column 6 lines 10-12). Further, the examiner takes Official notice that it is well known in the art to match the refractive index anisotropy values of the compensation layers to those of the liquid crystal cell to compensate the cell at wide viewing angles.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed the discotic films with the proposed refractive index anisotropy values. One would have been motivated to construct the films with such parameters in order to correctly compensate the liquid crystal cell at wide viewing angles to benefit from the expected results of such a match, such as display clarity at wide viewing angles.

Regarding claims 9 and 19, Nakamura '554 as modified by Nakamura '197 fails to disclose a first TAC film on the first polarizing plate and a second TAC film on the second polarizing plate. Hashimoto teaches such a film as advantageously placed on the polarizing plates as a protective film (Column 54 lines 44-65).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed first and second TAC films on the polarizing plates as proposed. One would have been motivated to place such films on the polarizers as protective films to shield the polarizers from outside elements while providing viewing angle compensation for the liquid crystal cell (Column 54 lines 55-65).

Regarding claims 8, 10, 18, and 20 Nakamura '554 as modified by Nakamura '197 fails to disclose the proposed ranges for R_{th} / R_e for each of the first and second discotic films, first and second biaxial films, and first and second TAC films. Hashimoto, however, teaches ranges for each of the values R_{th} and R_e for the discotic films, biaxial films and TAC films such that the proposed ratios fall within the taught ranges (Column 7 lines 46-52, Column 15 lines 30-38).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have prepared the films having the proposed ratio of retardation values. The proposed ratios fall within the acceptable ranges for such layers as taught by Hashimoto. One of ordinary skill in the art would have arrived at such ratios through routine experimentation and analysis to achieve a liquid crystal display having an optimized viewing angle characteristic. One would have been motivated to construct a display having layers with the proposed retardation parameters to achieve such a particular expected result.

Response to Arguments

Applicant's arguments filed 12/30/04 have been fully considered but they are not persuasive.

Regarding the rejection of claim 1 as unpatentable over Nakamura '554 in view of Nakamura '197, Applicant asserts that Nakamura '554 in combination with Nakamura '197 fail to disclose the first retardation value $R1/\lambda$ as between 1.35 and 1.75. Nakamura '554, however, teaches the retardation, R1, of the OCB type liquid crystal layer without a voltage applied (splay state) as from 0.8-2.0 (Column 3 lines 40-43). At R1= 0.9 for λ=0.61 um (red), $(R1/\lambda) = 1.475$.

Applicant also asserts a difference between an optical phase difference disclosed by Nakamura '197 and a retardation value. Nakamura, however, specifically discloses them as interchangeable (Column 3 lines 31-32).

Applicant asserts that Nakamura '197 fails to disclose the values V1 and V2 as corresponding to the production of white and black images. Nakamura '197, however, teaches a tunable transmittance between white and black and a corresponding difference in retardation

between the white and black states (Column 3 lines 24-30) and the retardation as variable according to the applied cell voltage (Column 3 lines 35-36).

Applicant asserts that Nakamura '554 is silent on the value of the refractive index anisotropy. Nakamura, however, discloses the value of the optical phase difference as the product of the refractive index anisotropy and the cell gap (d). Nakamura also discloses the thickness of the cell as variable between 7 um and 12 um (Table 1; Column 7 lines 48-61). Accordingly Nakamura teaches the proposed refractive index anisotropy within combinations of the preferred ranges. For example, Nakamura teaches a refractive index anisotropy of 1.2 for an optical phase difference of 1.0 and a cell gap thickness of 8 um.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael H. Caley whose telephone number is (571) 272-2286. The examiner can normally be reached on M-F 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael H. Caley
March 20, 2005
mhc

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